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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/663,759	09/17/2003	Tomoya Ohsugi	242554US3	3825

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EXAMINER

PHAM, HAI CHI

ART UNIT	PAPER NUMBER
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2861

DATE MAILED: 08/29/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/663,759

Applicant(s)

OHSUGI, TOMOYA

Examiner

Hai C. Pham

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-48 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-17, 23-41, 47 and 48 is/are rejected.
- 7) ☒ Claim(s) 18-22 and 42-46 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 17 September 2003 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 09/17/03.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: ____.

DETAILED ACTION

Priority

1. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Drawings

2. Figures **15, 16, 17, 18** and **19** should be designated by a legend such as -- Prior art-- because only that which is old is illustrated. See MPEP § 608.02(g). Corrected drawings in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Objections

3. Claim 21 is objected to because of the following informalities:
 - Line 2, "equal t , or smaller than" should read --equal to, or smaller than--.Appropriate correction is required.

Claim Rejections - 35 USC § 112

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter, which the applicant regards as his invention.

5. Claims 7 and 31 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 7:

- The following limitation “at least two sets of said supporting means are arranged such that a direction of said at least two sets, in terms of a direction of said optical axis, a primary scanning direction and a secondary scanning direction, is equal to each other” appears to be confused in that it is not understood how the claimed “direction” can be *quantitatively* defined.

Claim 31:

- Similarly, the following limitation “at least two sets of said supporting unit are arranged such that a direction of said at least two sets, in terms of a direction of said optical axis, a primary scanning direction and a secondary scanning direction, is equal to each other” appears to be confused in that it is not understood how the claimed “direction” can be *quantitatively* defined.

Appropriate correction is required.

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Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 1-3, 6-7, 11-14, 16, 23-27, 30-31, 35-38, 40, 47-48 are rejected under 35 U.S.C. 103(a) as being unpatentable over Naiki (U.S. 5,870,133).

Naiki discloses a laser scanner device (Fig. 2) comprising a plurality of light sources (semiconductor lasers 1 and 1'), a plurality of coupling lenses (respective collimator lenses 2 and 2') each corresponding to a light source of said plurality of light sources, a coupling lens holding unit (lens barrel supporting member 102) (Fig. 9) having a first and a second holding faces aligned approximately in parallel to an optical axis of a first coupling lens of said plurality of coupling lenses (the support member 102 having two inclined supporting faces 102a forming a V-shaped channel aligned in parallel to the optical axis 108 of the collimator lens 2), and a pressing member (second lens support member 103) pressing a side portion of said first coupling lens against said first and said second holding faces so as to thereby hold said first coupling lens (the second lens support member 103 presses the collimator lens 2 against the two inclined faces 102a using tightening screws 107) (col. 8, line 57 to col. 9, line 10).

Although Naiki teaches the second lens support member (103) is planar, and wherein ends of the second lens support member are fixed approximately

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symmetric with respect to the collimator lens (2) using a pair of tightening screws (10) so as to hold in between the collimator lens (2) in contact with the lens support member (102), Naiki, however, is silent about the type of material used for the second lens support member, e.g., elastic member, in fixing the collimator lens against the lens support member. However, Naiki further teaches using a plate spring (21) for press-fitting the cylindrical lens barrel (15a) against the two faces or V-shaped channel (16a) of the cylindrical lens barrel support member (16). Therefore, it would have been obvious at the time the invention was made to a person having ordinary skill in the art to provide an elastic member such as the plate spring used to press-fit the cylindrical lens for the second lens support member 103 in the device of Naiki. The motivation for doing so would have been to provide a flexible affixing means for retaining the collimator lens in place in the collimator lens mount.

Naiki further teaches:

- 2 a light source holding unit (laser support member 101) holding a first light source (1) of the plurality of light sources corresponding to said first coupling lens (2), and a fixing member (screws 106a) fixing said light source holding unit, wherein said fixing member fixes a position of said first light source displaceable over a plane perpendicular to said optical axis of said first coupling lens (the screws 106a fix the laser support member 101 into the surface 105 of the lens barrel support member 102, the surface 105 being perpendicular to the optical axis direction, wherein the position of the laser light source 1 can be adjusted in bi-dimensionally

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- within the plane perpendicular to the optical axis of the collimator lens)
- (col.6, line 63 to col. 7, line 1),
- wherein said fixing member (screws 106a) fixes said light source holding unit onto said coupling lens holding unit (against the surface 105 of the lens barrel support member 102),
 - wherein a supporting unit is formed, as one set, consisting of said first and second holding faces aligned approximately in parallel to said optical axis of said first coupling lens for holding said first coupling lens, and at least two sets of said supporting unit are formed integrally as one component (two sets corresponding to the two light source devices A and B) (Fig, 3a),
 - wherein a supporting unit is formed, as one set, consisting of said first and second holding faces aligned approximately in parallel to said optical axis of said first coupling lens for holding said first coupling lens, and at least two sets of said supporting unit are arranged such that a direction of said at least two sets, in terms of a direction of said optical axis, a primary scanning direction and a secondary scanning direction, is equal to each other (the two light source devices A and B are arranged such that the respective optical axis lengths are equal),
 - the pressing member has a coefficient of linear expansion approximately equal to that of a material of said coupling lens holding unit (second lens support member 103 and the lens support member 102 are made of aluminum and have equal coefficients of linear expansion),

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- a light beam deflection unit (polygon mirror 6), an optic system (scanning lenses 7 and 8), wherein the image formed on the surface of the photosensitive drum (25) is inherently rendered visible.

With regard to claims 14 and 38, Naiki teaches the collimator lens being made of glass with a coefficient of linear thermal expansion of 7.9×10^{-6} (or $\alpha_1 = 7.9 \times 10^{-6}$), the lens barrel support member (102) being made of aluminum (or $\alpha_2 = 23 \times 10^{-6}$) and the laser support member (101) being made of iron material (or $\alpha_4 = 11.7 \times 10^{-6}$) while the laser device or package A is made of aluminum (or $\alpha_3 = 23 \times 10^{-6}$), and thus the following inequalities with respect to the different coefficients of linear thermal expansion of the different components held:

$$\alpha_1 < \alpha_3, \quad \alpha_1 \leq \alpha_2 = \alpha_3 \quad \text{and} \quad \alpha_1 < \alpha_4 < \alpha_3$$

which amply satisfy the claimed inequalities.

8. Claims 4, 9, 28 and 33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Naiki in view of Watanabe (JP 09-186395).

Naiki discloses all the basic limitations of the claimed invention except for the lubricating means set at a location in contact between the coupling lens and the holding face.

Watanabe discloses a semiconductor laser module comprising a laser holder (22) and a lens holder (26) holding a semiconductor laser (20) and a coupling lens (24), respectively, which are press-fitted and use adhesive agent functioning as lubricant for carrying out a precise press-fitting operation.

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It would have been obvious at the time the invention was made to a person having ordinary skill in the art to provide a lubricant in the form of an adhesive agent as taught by Watanabe at the location in contact between the coupling lens and the holding face in the device of Naiki. The motivation for doing so would have been to carry out a precise press-fitting operation as suggested by Watanabe.

9. Claims 5, 8, 10, 17, 29, 32, 34 and 41 are rejected under 35 U.S.C. 103(a) as being unpatentable over Naiki in view of Nakajima et al. (U.S. 6,621,512).

Naiki discloses all the basic limitations of the claimed invention except for the portion of the coupling lens in contact with the holding face is subjected to surface hardening, at least two sets of the supporting unit being arranged such that a direction of said at least two sets, in terms of a direction of said optical axis, a primary scanning direction and a secondary scanning direction, is symmetrical to each other, the plurality of the light source units arranged in a row.

Nakajima et al. discloses a multi-beam light source device comprising a plurality of light emitting elements being arranged perpendicular to each other (Fig. 48) or in a row (Fig. 49), with the later configuration disposes the combined optical axis at the center of the symmetry formed by the optical axes of the respective light emitting elements, respective coupling lenses (12 and 13) being secured on the supporting member (9) with adhesive being hardened/cured by UV light after the positioning adjustment of the lenses (col. 9, lines 14-24).

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It would have been obvious at the time the invention was made to a person having ordinary skill in the art to provide the UV curing adhesive agent to the coupling lens at the location in contact with the holding face of the support member in the device of Naiki as taught by Nakajima. The motivation for doing so would have been to secure the coupling lens once the optimal positioning of the lens with respect to the corresponding light source has been established.

Also it would have been obvious at the time the invention was made to a person having ordinary skill in the art at the time the invention was made to arrange the light emitting elements of the device of Naiki in a row as claimed, since it has been held that rearranging parts of an invention involves only routine skill in the art. In re Japikse, 86 USPQ 70.

10. Claims 15, 39 are rejected under 35 U.S.C. 103(a) as being unpatentable over Naiki in view of Tanaka (U.S. 5,315,609).

Naiki discloses all the basic limitations of the claimed invention except for the coefficient of linear thermal expansion of the coupling lens being greater than that of the package unit.

Tanaka discloses a semiconductor laser module with lens holder compensating for thermal stress by carefully selecting the material for each component, wherein the lens holder (4) made of pure iron whose coefficient of linear thermal expansion is $\alpha_2 = 10 \times 10^{-6}$, fixes the coupling lens (2) whose coefficient of linear thermal expansion is $\alpha_1 = 11 \times 10^{-6}$, the laser holder (8) and the semiconductor laser package (4) both are made of Kovar with a coefficient of

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linear thermal expansion of $\alpha_4 = \alpha_3 = 5.7 \times 10^{-6}$), and thus the following inequalities with respect to the different coefficients of linear thermal expansion of the different components held:

$$\alpha_3 < \alpha_1, \quad \alpha_3 < \alpha_2 < \alpha_1 \quad \text{and} \quad \alpha_3 = \alpha_4 < \alpha_1$$

which amply satisfy the claimed inequalities.

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to selectively provide the different components with material having proper coefficient of linear thermal expansion in the device of Naiki as taught by Tanaka such that the thermal stress, which occurs between the components can be alleviated as suggested by Tanaka.

Allowable Subject Matter

11. Claims 18-22, 23/18-22, 24/23/18-22, 42-46, 47/42-46 and 48/47/42-46 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter: the primary reason for the indication of the allowability of claims 18, 20, 42 and 44 is the inclusion therein, in combination as currently claimed, of the limitation wherein the components of the laser scanner are selected in terms of coefficients of linear thermal expansion and the radii r_1 and r_3 are adjusted such that a positional deviation of the light beams on the member to be scanned is controlled to be equal to, or smaller than 50% of a dot pitch of the light beams,

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and wherein r_1 (mm) is a distance from said optical axis of said first coupling lens to a point of contact between said first coupling lens and said holding face; and r_3 (mm) is an outer radius of said package unit". The combined limitations as claimed are not found taught by the prior art of record considered alone or in combination.

Claims 19, 21-22, 23/18-22, 24/23, 43, 45-46, 47/42-46 and 48/47/42-46 are allowable because they are directly or indirectly dependent from claims 18, 20, 42 and 44 above.

Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hai C. Pham whose telephone number is (571) 272-2260. The examiner can normally be reached on M-F 8:30AM - 5:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David L. Talbott can be reached on (571) 272-1934. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



HAI PHAM
PRIMARY EXAMINER
August 26, 2005